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CNU-1/P SUSTENANCE KIT MODIFICATION (T-33)

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ARCTIC AEROMEDICAL LABORATORY

AEROSPACE MEDICAL DIVISION
AIR FORCE SYSTEMS COMMAND
FORT WAINWRIGHT, ALASKA

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FOREWORD

Research reported in this paper was done at the Arctic Aeromedical Laboratory, Environmental Protection Branch, under Project 8238, Task 823802, from November 1964 to October 1965.

Jump tests in Project 65-16 CNU-1/P Sustenance Kit Modification were conducted by assigned test parachutists SMSgt W. W. Millard, MSgt G. E. Roberts and MSgt J. R. Schumann.

Special acknowledgement is extended to the following Alaskan Air Command organizations who, through the efforts of their personnel, contributed immeasurably to the overall design and testing of the CNU-1/P Sustenance Kit Modification: the 317th Fighter Interceptor Squadron, Elmendorf AFB, Alaska; the 5010th Combat Support Group, Eielson AFB, Alaska; and the 5010th Search & Rescue Section (CH-21), Eielson AFB, Alaska.

This technical report has been reviewed and is approved.

HORACE F. DRURY
Research Director

ABSTRACT

At the request of the Alaskan Air Command, this Project was established to provide adequate cold-weather survival protection for T-33 pilots who utilize the seat-pack parachute. Pilots in this category had not previously been so equipped. After extensive evaluation and operational testing, the Alaskan Air Command approved modification of CNU-1/P for use with the seat-pack parachute in the T-33 jet aircraft. The kit is now in use during the period October through May. In addition to basic survival items, the kit contains a down-filled coat, SRU-6P; mittens, SRU-10P; and half bag or foot sack, SRU-12P. The problem of bulk reduction was solved by tufting, using manual pressure and upholstering methods. Packaging of the down-filled clothing into the CNU-1/P kit can be done by local Personal Equipment Technicians with a small expenditure of man-hours and materials.

I

INTRODUCTION

It has been found that operational pilots in the Alaskan Air Command flying the T-33 aircraft and using a seat-pack parachute do not have appropriate equipment enabling them to survive exposure to arctic cold following ejection from the airplane. The CNU-1/P kit, with its basic survival items, does not supply the survivor with a sleeping bag of any kind. The fact that a would-be survivor can exist for 3 - 5 days without food, provided he can keep warm, dictates the need for adequate protection against the arctic environment. The most desirable items affording such protection are the three basic items of the down-filled USAF SRU Survival Assembly: (1) Coat, SRU-6P; (2) Mittens, SRU-10P; and (3) the Half bag or foot sack, SRU-12P. These items, available to a downed pilot, can well mean the difference between survival or disaster.

The normal clothing worn by the jet pilot operating in the arctic takes care of his thermal protection in the event of ejection and for a limited period thereafter. However, the need for additional protection is evident within 2 - 3 hours after the initial physiological strain of the emergency passes. In case of injury, the need for adequate protection will be evident much sooner. The adequacy of the CNU-1/P kit as modified is dependent on the pilot wearing appropriate footgear, i.e., mukluks or Vapor Barrier Boots.

This report describes a method by which each of the pilots using the seat-pack parachute can be equipped with adequate cold-weather protective clothing through the use of the CNU-1/P kit (Modified.)

In addition, it is possible to include a Rescue Locator Beacon (RLB), such as SARAH or the URT-21, in the CNU-1/P Kit. Elimination of the outside vest containing the RLB improves comfort of the pilot. The RLB, as packaged in the CNU-1/P (Modified), is readily available for inspection, bench test, etc., without breakdown of the entire kit.

The CNU-1/P Kit (Modified) has been tested and evaluated by operational units within the Alaskan Air Command. All prototypes were test-flown on actual missions in order to get an accurate evaluation by the user. In addition, each type was jump-tested to determine if any hazards or discomfort could be noted during flight, parachute deployment, manipulation, and landing.

The constructive comments of the evaluators have been incorporated in the modification presented in this report. Through the implementation of this modification, T-33 pilots using the seat-pack parachute can be equipped

with adequate survival clothing and equipment to sustain the rigors of an arctic survival experience.

II

METHODS

Several means of reducing the prime obstacle of bulk have been tried and proven. In the early stages of development, vacuum packaging of down-filled garments was investigated. The method, although very effective in bulk reduction, does have shortcomings which caused this approach to be discarded.

For information only, the following are some disadvantages noted during the design and test phases as they apply to vacuum packaging. Special equipment is needed, such as polyethylene packaging material, either pre-cut bags or by the roll, in addition to a heat sealer which is required to close the bags. Special valves are needed to properly evacuate the residual air and to seal the package when the vacuum has been attained. In addition, the package must be restrained by other means so that residual air can be bled off when exposed to low pressure at high altitude. This, involves the wrapping of the entire package with a strong tape. Tape, when the package is utilized under arctic survival conditions, makes it extremely difficult for the survivor to get the clothing out. After several methods of restraints had been tried, i.e., light metal containers, basswood restraints, etc., (Figures 1 and 2), it was decided that vacuum packaging offered only a method of reducing the overall size of the package. It was, therefore, discarded as impractical due to requirements of special equipment, manpower, and supplies. One other disadvantage in vacuum packing was the rigidity of the finished package. This rigidity did not cause any discomfort on bailout, as was determined by the test jumpers, but it did cause some discomfort in the aircraft, in that the kit would not conform to the contoured backrest of the seat. It was evident that a "soft" or semi-rigid package was needed.

The final solution to the problem of bulk reduction came in the form of tufting, using manual pressure and upholstering methods.

Technical Data

Utilizing a standard CNU-1/P Sustenance Kit, the foam rubber tray is removed and discarded. If the SARAH (Search-Rescue and Homing RLB) is to be used, a retaining pocket for the power pack is sewn into the upper right or left quadrant of the container. The restraint eliminates the possibility of the power pack shifting during handling and/or ejection (Figure 3).

When the container is being closed, the pressure will hold all items in place.

Tufting

Smooth the entire package to ensure that all items are evenly spaced. (corners should be well filled.) Tufting is done from the lower end of the container as illustrated in Figures 4 and 5, forcing the needle through the down-filled clothing. Needle is threaded with double nylon, button inserted on singular strand at loop. The recommended method is to start from the top side with one button, force needle through webbing, pack, clothing, and webbing on underside. Top side; button can now be pulled into webbing, anchoring it securely. Move over 3 - 4 inches along tape and reinsert needle through entire thickness, including top tape. Needle is now removed, a button is installed, and using a standard upholstering knot (bowline on a bite) tension is applied. Knot will automatically lock at maximal tension, which can best be obtained by a combination of hand pressure and pulling applied evenly.

When sufficient tension has been reached, knot is tied off by two reversed square knots, and loose ends cut off. Procedure is then repeated until bulk is reduced and desired tapering achieved. Webbing used to reinforce container, and placed as suggested in Figure 6, aids in the easy access to the kit when opened in a survival situation.

If the sewer works across base of container and then moves upwards in steps, the tapered effect is achieved, (Figure 6). Caution should be exercised when tufting in and around the survival items. Placing the tufting properly will secure items in place.

The RLB can be readily removed for inspection, etc., without disturbing any of the survival items.

Packaged in this fashion, the CNU-1/P Kit (Modified) ensures sufficient clearance for the pilot, in that the tapered kit does not noticeably effect the clearance required for safe ejection (Figure 7).

Equipment

CNU-1/P Container	1 each
Needle, double end, upholstering	1 each
Button, upholstering, metal	16 each
Cord, upholstering, nylon (80 lb TS)	as req
Webbing, cotton, OD, 1/4" wide	8 ft

The above equipment is needed for one kit; the restraint pocket can be made up at a Parachute or Fabrication Shop. The entire modification can be accomplished by Personal Equipment Technicians in approximately 30 minutes.

FIGURE 1

Light metal container damaged during parachute deployment and on landing

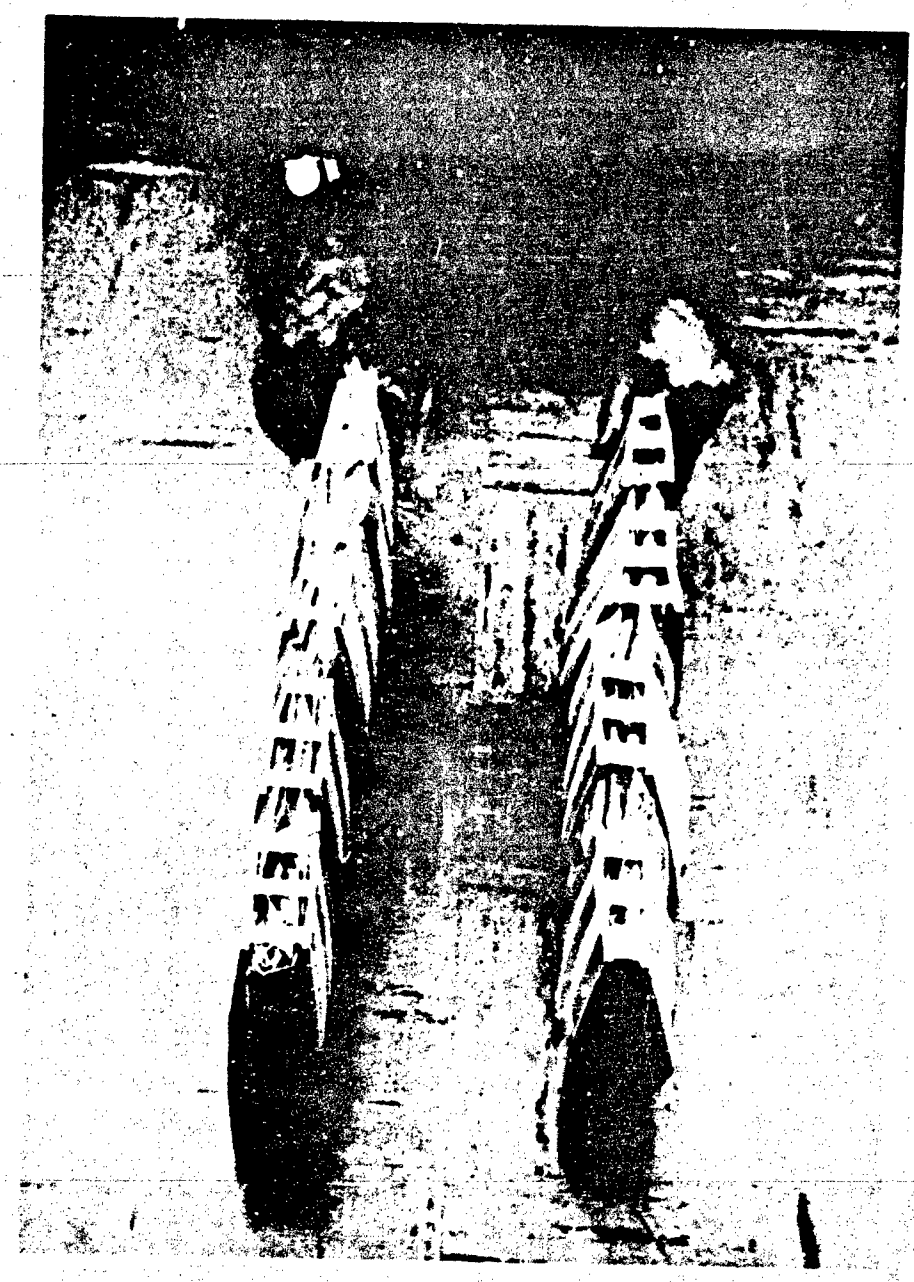

FIGURE 2

Basswood restraints with vacuum packaging. Left w/bleed off -- right w/o bleed off; damaged on test flight to 36, 000 ft.

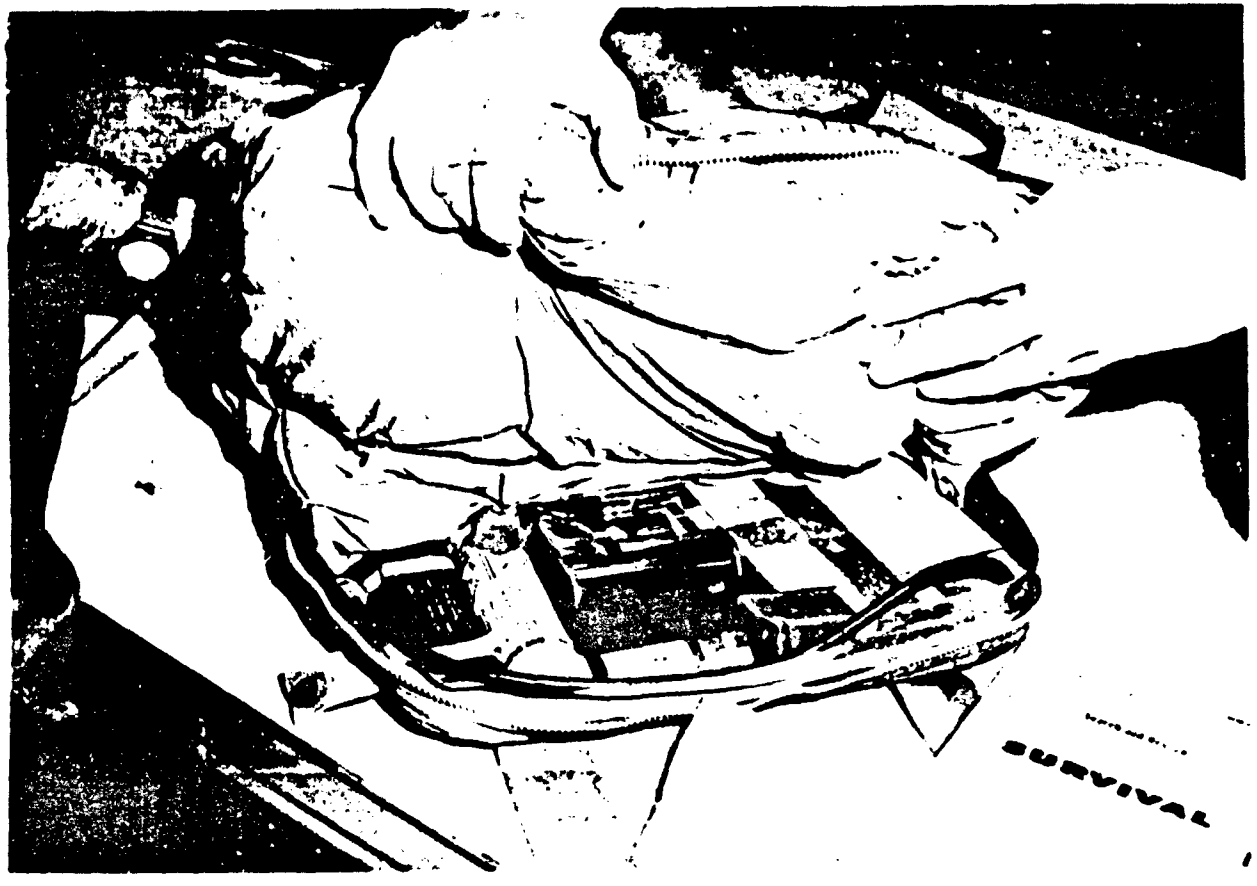

FIGURE 3

Restraint pocket for SARAH RLB power pack shown at right corner.
Survival items placed across top as indicated

FIGURE 4

Single nylon cord is threaded through button, then doubled through needle. Needle is then forced through entire thickness of kit

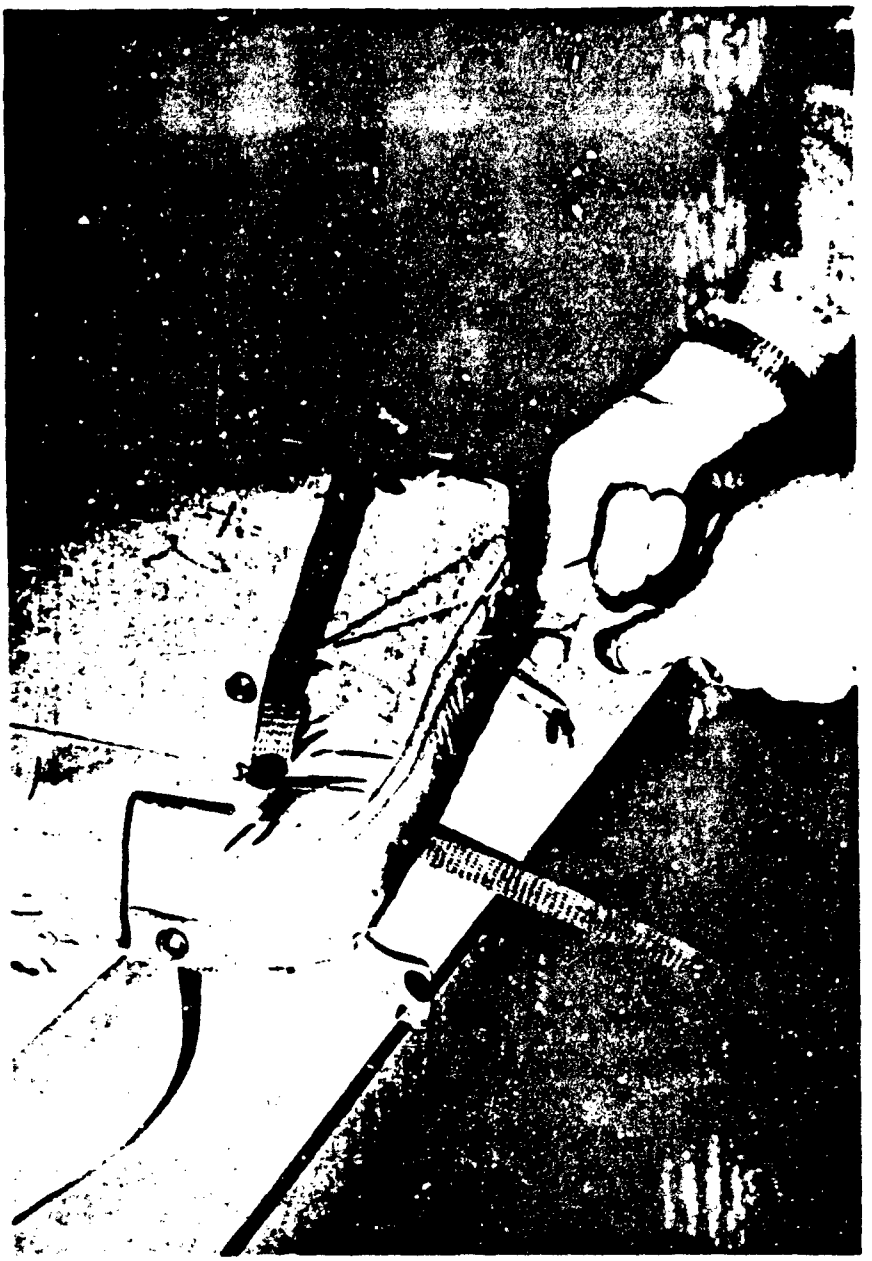

FIGURE 5

Using standard upholstering knot, the slack is taken up, as pressure is applied. Reduction of bulk is readily accomplished

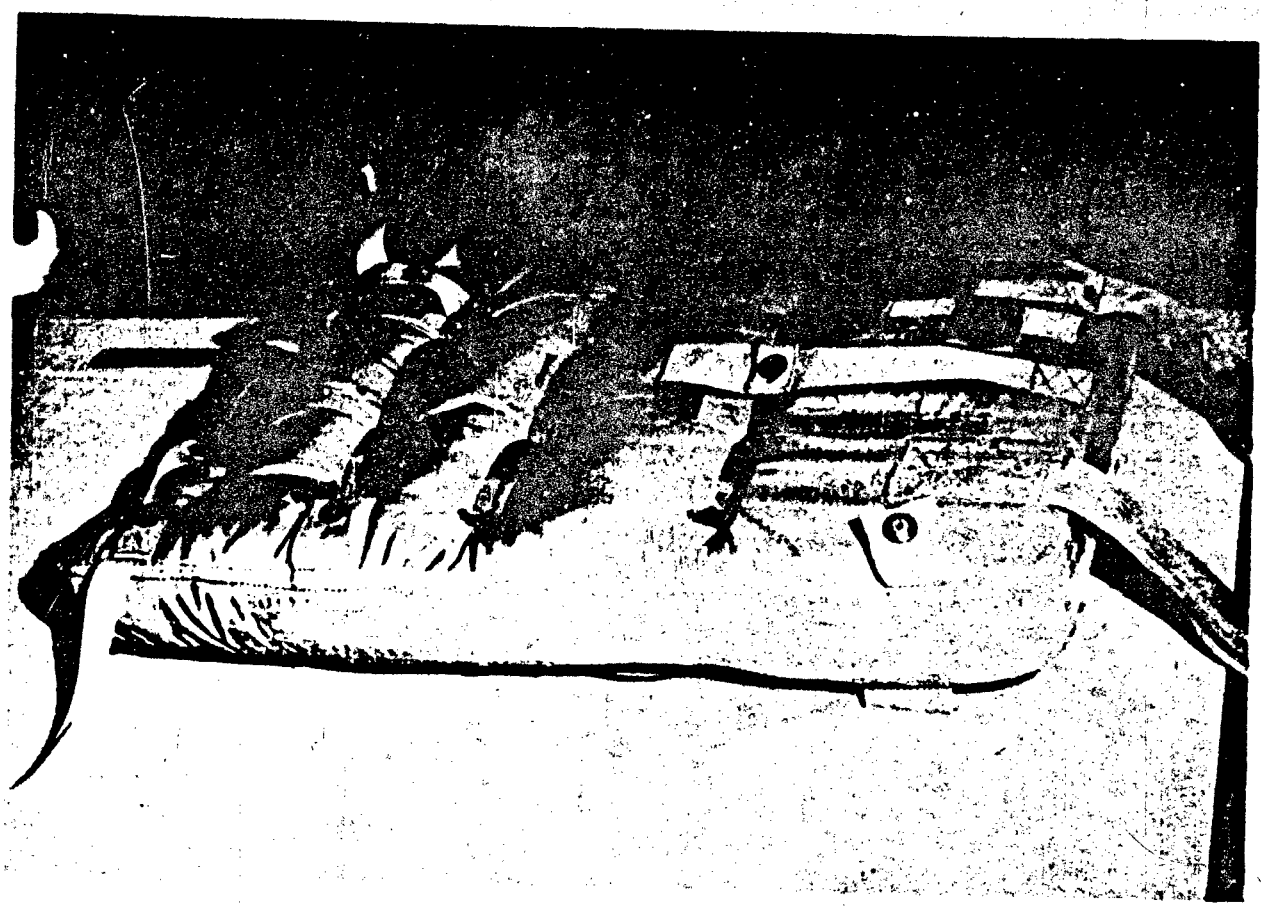

FIGURE 6

Strand of nylon cord is cut and webbing pulled off. Kit can then be opened readily. NOTE tapered effect of kit

FIGURE 7

Static testing of kit worn in the front seat of T-33. Tapered kit allows for adequate knee clearance

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